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INTERSTATE VARIATION IN STATE AND LOCAL GOVERNMENT

DIRECT GENERAL EXPENDITURES, UNITED STATES OF AMERICA, 1957

by

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The undersigned certify that they have read, and recommend
to the Faculty of Graduate Studies for acceptance, a thesis
entitled INTERSTATE VARIATION IN STATE AND LOCAL GOVERNMENT
DIRECT GENERAL EXPENDITURES, UNITED STATES OF AMERICA, 1957
submitted by Walter Clarke Hepburn in partial fulfilment of the
requirements for the degree of Master of Arts.

ABSTRACT

Many studies of the determinants of interstate variation in per capita state and local government expenditure have been made since the release of the findings from the 1957 Census of Governments. This thesis is an analysis of per capita expenditures in 1957 for the various functions performed by state and local governments to identify and assess the relative importance of the major common determinants of variations in expenditures among states.

The approach employs simple and multiple correlation techniques, the former to assist in the selection of factors to be considered in combination by use of multiple linear regression analysis. An evaluation of the combined effectiveness of the four explanatory variables selected is undertaken.

The four factors considered statistically explain 66 per cent of the interstate variation in state and local government per capita expenditures. They are significantly correlated with every expenditure category with the exception of expenditure on public welfare, and vary in individual importance with respect to each expenditure category. Validity of results would be improved by the replacement of non-tax revenue per capita as an explanatory variable and the development of an adjusted index of population dispersion within a given area is also suggested. Further investigation, particularly with respect to expenditure categories considered on an individual basis, would prove rewarding.

ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

State and local governments in the United States of America in
1957 encompassed slightly more than 100,000 units of government with
jurisdiction over a population of some 170 million. Expenditure for
state and local government activities amounted to $47.6 billion,
approximately 11 per cent of the national income in 1957.[1] This thesis
is a study of interstate variation in per capita expenditures in 1957
for the various functions performed by state and local governments.

The extent of variation in expenditures of state and local govern-
ments is first considered in Chapter $\overline{ll}$ in terms of total expenditures
and expenditures for the separate categories, as classified by function
by the Bureau of the Census.[2] The association between expenditure
variations per capita and several measurable factors is discussed in
Chapter $\overline{lll}$, after an outline of the method and procedures employed
is presented. With the assistance of the technique of simple correlation,
representatives of four factors thought to explain interstate variations
in expenditures are selected for consideration with the use of multiple
linear regression analysis.

The results of the multiple regression analysis are presented in

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[1]Laszlo Ecker-Racz, "A Foreign Scholar Ponders the 1957 Census of
Governments." National Tax Journal, Xll (June, 1959), p. 102.

[2]U.S. Department of Commerce, Bureau of the Census, 1957 Census
of Governments, Advance Release No. 8, "State and Local Government
Finances in 1957," (U.S. Government Printing Office, Washington, D.C.,
1959), pp. 28 - 76.

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Chapter $\overline{IV}$ and are compared with those obtained from similar invest-
igations. The closing chapter summarizes the analysis and conclusions,
indicating a broad field for further investigation, particularly with
respect to the investigation of individual per capita expenditure
categories.

The cross sectional analysis of 1957 expenditure data should
indicate some of the major factors associated with the level and
differences in state and local government activities. No attempt is
made to account for any differences in quality and quantity of
government services provided, nor are specific adjustments made for
interstate variation in price levels.

CHAPTER 11

INTERSTATE DIFFERENCES IN EXPENDITURES

Comparison of expenditures by a state and its local governmental units indicates wide differences among states. As there are marked differences in the division of local governmental responsibilities among states, it is convenient to consider aggregate expenditures of a state and the local governments in it. For example, the provision of public schools is a function of independent school districts in many states and in others is the responsibility of other types of government, with a composite situation existing in 15 states. Townships operate in 22 states, and vary widely in responsibilities.[1]

The recipients of government services are people, and the governmental system in the United States operates on the basis of one vote accorded to each person over a certain age. An analysis of per capita expenditures of state and local governments is therefore most meaningful, and serves as a measure of need, as it "presumes a rough equality of need for public services".[2]

The Bureau of the Census provides comprehensive fiscal data for the several functions of state and local governments. Expenditures include capital outlays as well as current operation. Only final, or direct, expenditure of state and local governments is considered

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[1] *Ibid.*, p. 2.

[2] E. J. Hanson, *Fiscal Needs of the Canadian Provinces*, Canadian Tax Paper No. 23, Canadian Tax Foundation, Toronto, 1961.

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as data are net of intergovernmental transactions. Total direct

government expenditure excludes utility, liquor stores and insurance

trust expenditures. Appendix A presents a detailed description of ·

the functional categories, as determined by the Bureau of the Census.

Extensive variation in per capita state and local general

expenditure is indicated by Table 1. Expenditures range from $368

per capita in Nevada to $148 in Arkansas, with average general expend-

iture at $236 per capita. In particular areas, Nevada, Wyoming, and

California per capita expenditures are $368, $328 and $321 respectively,

although Idaho and Utah expenditures are substantially less at $233 and

$232, respectively. General expenditure at $272 is higher in Kansas than

in Nebraska, at $202 per capita, and Missouri, at $197 per capita.

Similarly, Louisiana per capita general expenditure at $277 is substan-

tially higher than Arkansas, $148, Mississippi, $152 and Alabama, $178.

Other southern states in the $150 - $200 range are Kentucky, $154, West

Virginia, $155, Virginia, $189, North and South Carolina, $162 and $155,

and Georgia, at $186. The north central state of Michigan at $263 per

capita is markedly higher than general expenditure by Indiana at $207

per capita. In short, the variations recorded indicate a regional

analysis of state and local government expenditure would serve in

explaining interstate expenditure differences, but is beyond the scope

of the present study. Initially, the study also included an examination

of expenditure data on the basis of a 36 state analysis, excluding the

southern states. Table 2 and other tables in Appendix C relate to the

36 state study.

The relative importance of the individual functions is given by

TABLE 1

Measures of Variation in State and Local Government
Expenditures Per Capita, 48 States, 1957

Expenditure Category	Range Highest	Lowest	Mean Expenditure	Standard Deviation
Total General Expenditure .	$367.71	$147.56	$236.10	$51.10
Total Education Expenditure	119.87	51.31	82.70	17.70
Higher Education	24.73	3.24	13.65	.6.02
Local Schools	98.22	39.78	66.90	13.59
Highways	106.69	25.33	53.00	17.90
Public Welfare	46.37	6.77	19.88	8.28
Health and Hospitals	32.30	8.06	16.99	5.57
Police	14.47	3.43	7.24	2.74
Local Fire	11.40	1.33	4.07	2.20
Natural Resources	29.62	2.28	7.92	5.86
Sanitation	16.88	1.71	7.15	3.46
General Control	21.97	5.21	9.94	3.00
Interest on General Debt ..	12.60	1.12	5.31	2.46
All Other	45.27	8.06	21.64	8.81

Source: Computed from data appearing in U.S. Department of Commerce, Bureau of the Census, 1957 Census of Governments, Advance Release No. 8, " State and Local Government Finances in 1957," (U.S. Government Printing Office, Washington, D.C., 1959) pp. 15-76.

TABLE 2

Comparison of Per Capita State and Local Government Expenditure

48 and 36 States, 1957.

Function	Mean			Coefficient of Variation		
	48 States	36 States	Difference	48 States	36 States	Difference
Total Direct General Expenditure	$236.00	$245.40	- $9.40	21.6	19.6	2.0
Total Education Expenditure	82.70	85.10	- 2.40	21.4	19.3	2.1
Higher Education	13.70	13.90	- 0.20	44.1	44.3	- 0.2
Locals Schools	66.90	69.00	- 2.10	20.3	18.2	2.1
Highways	53.00	56.20	- 3.20	33.7	33.1	0.6
Public Welfare	19.90	19.00	0.90	41.6	36.5	5.1
Health and Hospitals	17.00	18.00	- 1.00	32.7	32.1	0.6
Police	7.20	7.70	- 0.50	37.8	37.1	0.7
Fire Protection	4.10	4.60	- 0.50	54.0	49.5	5.5
Natural Resources	7.90	7.80	0.10	73.9	78.1	- 4.2
Sanitation	7.20	7.60	- 0.40	48.3	46.4	1.9
General Control	9.90	10.50	- 0.60	30.0	28.2	1.8
Interest on General Debt	5.30	5.40	- 0.10	46.3	48.7	2.4
Other	21.60	23.20	- 1.60	40.7	38.3	2.4

Source: Ibid.

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the mean per capita expenditure of states and local governments, shown
in column 3 of Table 1. In dollar totals, education, highways, public
welfare, and health and hospitals account for approximately $28 billion
or 70 per cent of all state and local general expenditure. Education
expenditure ranks first at $14 billion or 35 per cent of general expend-
iture and highways, next, at 19 per cent.

The variation of expenditure for the individual functions is shown
by Table 1. Columns 1 and 2 indicate the range of expenditure, and
dispersion about the mean value is indicated by the standard deviation.
Column 4 of Table 2 indicates relative dispersion in terms of the
coefficients of variation, defined as the ratio of the standard deviation
to the mean, expressed as a percentage.

The range of coefficients of variation extends from 20.3 for local
schools to 73.9 for natural resources expenditure. Expenditures for public
welfare, police, fire protection, and sanitation vary to a greater extent
among states than education, highway and health and hospital expenditure.

The degree of association between each pair of expenditure categor-
ies is shown by Table 3. Correlation between functional categories
suggests that variation in state and local outlays are to some extent
similar, in that the greater the correlation, the more likely is the
resemblance of underlying influences. Most noticeable is the relatively
small correlation between public welfare expenditures and the other
functions, while police, fire protection, sanitation, and health and
hospital expenditures are statistically interrelated. The simple correlation
coefficients, in general, indicate a small or moderate association between
the different categories, suggesting an individual analysis of each function.
Table 4, Appendix C shows the correlation between expenditure categories
based on a 36 state sample, and does not suggest different conclusions.

TABLE 3

Coefficients of Simple Correlation between Per Capita Expenditure Categories 48 States, 1957.

Expenditure Category	Total Education	Higher Education	Local Schools	Highways	Public Welfare	Health and Hospitals	Police	Local Fire	Natural Resources	Sanitation	General Control	Interest on General Debt
Higher Education	0.78											
Local Schools	0.95	0.57										
Highways	0.49	0.40	0.45									
Public Welfare	0.20	0.22	0.17	0.05								
Health and Hospitals ...	0.38	-0.01	0.51	0.32	0.08							
Police	0.33	-0.15	0.51	0.12	0.03	0.76						
Local Fire Protection ..	0.15	-0.23	0.31	0.21	0.12	0.75	0.82					
Natural Resources	0.56	0.56	0.48	0.50	0.09	0.22	0.13	-0.01				
Sanitation	0.19	-0.12	0.31	0.05	-0.12	0.52	0.75	0.55	0.02			
General Control	0.65	0.36	0.68	0.57	0.15	0.64	0.66	0.55	0.67	0.48		
Interest on General Debt	0.00	-0.44	0.18	-0.07	0.07	0.49	0.68	0.57	-0.30	0.51	0.22	
All Other	0.34	-0.05	0.48	0.31	0.11	0.74	0.82	0.75	0.21	0.56	0.71	0.57

Source: _Ibid._

CHAPTER lll

FACTORS AFFECTING STATE AND LOCAL GOVERNMENT

EXPENDITURE VARIATIONS IN 1957

Variations in expenditure among state and local governments can
be attributed to several major factors in addition to the three stand-
ard factors receiving general attention. For the group of 48 states
analysed in a study of state and local government operating expenditures
in 1942, Solomon Fabricant found that 72 per cent of the variation in
total general expenditure per capita could be attributed to "income,
urbanization, and density of population".[1]

For particular functions, his regression analysis yielded a range
of coefficients of determination extending from .29 to .85 indicating a
wide degree of difference in the association of the three variables with
individual expenditure categories.[2]

Using the three common variables, in a regression analysis of 1957
state and local government per capita expenditures, Glenn Fisher found
the variables were associated to a lesser degree with general expenditures
than in 1942, although the pattern of explained variation of individual

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[1]Solomon Fabricant, The Trend of Government Activity in the United
States since 1900. (New York: National Bureau of Economic Research,
Inc., 1952), p. 122.

[2]Income refers to personal income measured in dollars per capita;
urbanization is the percentage of population in centres of 2,500 or more;
and density is population per square mile.

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government activities remained generally similar.[3] Further analysis
recorded by Seymour Sacks and Robert Harris of 1960 expenditure data
attributed 53 per cent of the interstate variation in total general
expenditure per capita to the three factors.[4]

Comparison of the Fabricant study with subsequent results is
impaired to some extent by the exclusion of capital outlays in the
expenditure categories for the year 1942. However, on the basis of
results obtained from analysis of 1957 and 1960 per capita expenditure
data, the exclusion of capital outlays in the Fabricant study does not
severely restrict useful comparisons.[5]

A summary of the results obtained using the three common measurable
factors is presented in Table 4.[6] It is evident that the three factors
explain a decreasing proportion of interstate variation in total general
expenditures over the time interval from 1942 to 1957, with little differ-
ence in association between the years 1957 to 1960. With the exceptions
of the highway and local school expenditure categories, this trend holds
for the individual functions, particularly in the cases of public welfare
and health and hospital expenditures per capita.

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[3]Glenn W. Fisher, "Determinants of State and Local Government
Expenditures: A Preliminary Analysis," National Tax Journal, XlV
(December, 1961), pp. 349 - 55.

[4]Seymour Sacks and Robert Harris, "The Determinants of State
and Local Government Expenditures and Intergovernmental Flows of Funds,"
National Tax Journal, XVll (March, 1964), pp. 75 - 85.

[5]Capital expenditures in 1942 were restricted by World War ll,
and analysis of government functions such as local schools requiring
fairly substantial capital expenditures does not indicate a wide
disparity in the coefficients of multiple determination between 1942
and 1957.

[6]Ibid., p. 76.

TABLE 4

Coefficients of Multiple Determination (R^2) for Regression of
Per Capita General Expenditures on Population Density,
Per Cent Urban, and Per Capita Income,
1942, 1957 and 1960

Expenditure Category	1942 [a]	1957 [b]	1960 [b]
All General Expenditures	.72	.53	.53
Higher Education	N.C.	.37	.45
Local Schools	.59	.62	.60
Highways	.29	.34	.37
Public Welfare	.45	.14	.11
Health and Hospitals ...	.72	.46	.44
Police	.81	.74	.79
Fire Protection	.85	.67	.74
General Control	.59	.45	.52

N.C. = Not computed.

[a] For 1942 general expenditures include expenditures for current purposes only. Capital outlays which are excluded were negligible.

[b] For 1957 and 1960 capital outlays are included in each expenditure category.

Source: Seymour Sacks and Robert Harris, "The Determinants of State and Local Government Expenditures and Intergovernmental Flows of Funds," National Tax Journal, XV11 (March, 1964), p. 76.

Sacks and Harris also note a

...remarkable stability in the net relationships, i.e., the regression
coefficients of the individual determinants to the several expenditure
categories for the time period covered....The variables that contrib-
uted significantly to the regressions in 1942 are generally the same
as those which are significant for 1960....For most functions popula-
tion density and per cent urban do not add significantly to the regress-
ions. Thus, in only one case are all three independent variables
significant. In only one case is income not significant - public
welfare.[7]

The results indicate that the three common variables do not provide

generally satisfactory statistical explanations of interstate expenditure

variations. In commenting upon the use of the three variables, Elliott

R. Morss states that

...Hopefully...the custom of throwing Fabricant's 'troika' of
independent variables into virtually every regression can be
stopped....In 1965, using two variables as highly correlated as
population density and the degree of urbanization as independent
variables in the same regression equation borders on the absurd.[8]

A number of explanations of expenditure variations include reference

to other factors as well as one or more of the three standard independent

variables. The study of Kurnow[9] includes per capita federal aid, and the

student-teacher ratio in elementary schools in addition to income and

urbanization as predictor variables, in a joint regression model. Sacks

and Harris[10] include in their multiple linear regression the three basic

factors as well as state aid per capita and federal aid per capita. In

a recent article, Fisher[11] considers twelve variables, from which seven

[7]Ibid., pp. 76 - 78.

[8]Elliott R. Morss, "Some thoughts on the Determinants of State and
Local Expenditures", National Tax Journal, XlX (March,1966), pp. 95 - 103.

[9]Ernest Kurnow, "Determinants of State and Local Expenditures
Reexamined", National Tax Journal, XVl (September,1963), pp. 252 - 255.

[10]Sacks and Harris, op. cit., pp. 75 - 85.

[11]G. Fisher, "Interstate Variation in State and Local Government
Expenditure", National Tax Journal, XVll (March,1964), pp. 55 - 74.

are selected for a multiple regression analysis. In addition to density

of population and urbanization, another demographic indicator is included -

per cent increase in population, 1950 - 1960. The four other variables

selected were socio-political and economic in nature.[12] He succeeded in

explaining 65 per cent of interstate variation in total direct general

expenditure, attributed mainly to two variables, representatives of

income and the tax system.

In commenting on the Sacks and Harris analysis, Fisher notes that

federal aid forms part of the dependent variable in each expenditure

category.[13] This feature receives further attention from Morss, who

states that

> ...little is to be gained from simply regressing the dependent variable
> on itself or on parts of itself....Where there are interactions between
> the parts...one needs more than a single equation model.[14]

It can be seen from the studies recorded that many factors contribute

to variation among states in government activities. The influences are

diverse in nature and in some instances difficult to measure, if measure-

ment is possible. Conditions among states are rarely uniform, with

evident differences in geographic regions, climate, natural and commercial

resources, varying rates of economic development, ethnic, cultural and

religious diversities, uneven dispersion of population, and rates of

growth, as well as different age structures of population among states,

all reflecting different needs for government activities.

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[12]The variables were: per cent of families with income under $2,000,
1959; per capita yield of a representative tax system, 1960, as a per cent
of the U.S. average; an index of two party competition; and the per cent
of population over 25 years of age with less than 5 years of schooling,
1960.

[13]Ibid., p. 72.

[14]Morss, op. cit., p. 97.

Scope and Method

It is apparent that variation in per capita expenditures is associated with the different demographic, economic and socio political features of individual states. Twenty-one representatives of these influences were examined by statistical techniques, with four "independent" variables selected for study by means of multiple linear regression analysis. All expenditure categories were studied in terms of the selected group of four variables, rather than introducing different groups of independent variables as a "general" explanation of interstate variation pertaining to each expenditure category was desired. Separate examination using different groupings of independent variables for each expenditure category is beyond the scope of the study.

The initial phase of the analysis utilized the technique of simple correlation to provide an indication of the interrelationship among the variables considered, used as a guide in the selection of the group of "independent" variables examined in phase two of the study. Actual selection of the group of factors was a matter of judgement. There is a limit to the number of independent variables that can be analysed by multiple regression analysis on the basis of a sample containing 48 observations.[15] For the purposes of the study the number of four independent variables seemed appropriate. Secondly, factors highly associated with a number of expenditure categories were deemed preferable to variables highly associated with a particular function and largely unrelated to other expenditure categories.

Multiple linear regression analysis is employed in the second phase of the study to determine the lines which best fit, in the least squares

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[15] M. Ezekiel and K. A. Fox, Methods of Correlation and Regression Analysis, (New York: John Wiley and Sons, Inc., 1959), p. 183.

sense, the relationships between the individual expenditure categories
and the four variables selected. That is, in general form using matrix
notation, if

y is an n x 1 vector of n observations of the dependent variable
(per capita expenditures),

X an   n x m matrix of n observations of m explanatory variables

β an   m x 1 vector of m coefficients; m < n,

β is chosen so that

$$\min\{Q \equiv (y - X\beta)'(y - X\beta)\}$$

or $\min\{Q \equiv y'y - 2\beta'X'y + \beta'X'X\beta\}$.

The value of β which minimizes the sum of the squared residuals is

$$\frac{\partial Q}{\partial \beta} = -2X'y + 2X'X\beta = 0$$

$$X'X\beta = X'y$$

$$\hat{\beta} = (X'X)^{-1}X'y.$$

The determination of β provides the parameters required for the regression
equation pertaining to each expenditure category.[16]

From the regression equations, the net regression, "beta" and
elasticity coefficients are obtained, as are the partial and multiple
coefficients of determination and correlation. The net regression
coefficients indicate the average change in the dependent variable
occurring with a change in a specific independent variable, the other
independent variables held constant at their mean values.

As the size of the net regression coefficients is dependent upon
the units of measurement in which the variables are expressed the
relationship can be stated in terms of units of the standard deviation
of each variable. This measurement is termed the beta coefficient and

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[16]A concise treatment of the topic is available in J. Johnston,
Econometric Methods, (New York: McGraw - Hill Book Company, Inc., 1963),
Chap. 4.

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is obtained by multiplying the ratio of the standard deviation of the explanatory variable to the standard deviation of the dependent variable by the regression coefficient, providing a means of directly comparing the relative importance of the independent variables in explaining interstate variation in the per capita categories.[17]

Elasticity coefficients measure the percentage change in per capita expenditures that are associated with a change of one per cent in an individual independent variable, computed at the mean points of two variables, the other variables having been held constant at their mean values. Elasticity coefficients are further measures, expressed in percentage terms, of the relative importance of each of the explanatory variables, and provide an indication of the rate of change of the dependent variable with respect to an independent variable.[18]

The coefficient of multiple correlation provides a measure of the proportion of the variation in the dependent factor explained by the groups of independent factors. It is the square root of the ratio between the explained and the total variance of the dependent variable. The actual ratio is termed the coefficient of multiple determination, or the square of the coefficient of multiple correlation. The proportion or percentage of variation explained by the combination of several factors is usually expressed by the coefficient of multiple determination.

Independent Variables

The independent variables considered in the study are grouped into

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[17]Another means of assessment of the relative importance of the individual factors considered in the regression is by use of coefficients of partial determination, defined as a measure of the reduction in unexplained variation of the dependent variable occurring when one new factor is added to the other independent variables considered.

[18]At the mean values of the variables.

two categories, that of population representatives, and other factors.
Table 1 - 3 in Appendix C present the coefficients of simple correlation
between the pairs of independent variables, (defined in Appendix B), pairs
of dependent expenditure variables and between individual expenditure
categories and the independent variables.[19]

Differences in the basic population characteristics of each state
are widely recognized as contributing to interstate variation in govern-
ment expenditures, as indicated by the analysis of expenditures in per
capita terms. Two factors have been used extensively in analysis; urban-
ization and density of population. Fabricant[20] concludes that urbanization
is a minor factor in accounting for differences in interstate government
expenditure, not more important than density, and substantially less
important than income. "Urbanization, in the simple correlations that
have been made in the past, is apparently a strong influence on expend-
itures only because it is itself highly associated with income."[21]

Coefficients of simple correlation between urbanization, income,
and density are presented in Appendix C, Table 1. It is evident that
urbanization and income are highly correlated at 0.83, as are urbanization
and density at 0.67. A moderate relationship at 0.50 exists between
density and income. As income and urbanization are strongly associated,
in part due to the production advantages entailed, urbanization as an
explanatory variable was dropped in favor of density as an indicator of

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[19]Density of population is recorded in the non-population category
in the relative tables in Appendix C for illustrative purposes as it was
selected as an independent variable in the multiple regression analysis.

[20]Fabricant, op. cit., p. 127.

[21]Ibid.

the spatial distribution of population. In a recent analysis by Fisher,[22] the degree of urbanization was found significant in four expenditure categories, while density proved significant in five cases.

Density provides a direct measure of population dispersion within given boundaries, although the variable is not normally adjusted for extensive uninhabited or sparsely populated areas. Simple correlation analysis indicated a marked positive association between density and police, 0.57; and local fire protection, 0.64; with a negative relationship to higher education expenditure, -0.52. The percentage of population in urban centers, while providing a picture of the rural-urban scene, is highly associated with income and is not directly related to land area. As an indicator of population dispersion, density would appear preferable and was used in the multiple regression analysis. The factors represented by the variable are state population and area. The extent of urbanization distorts the usefulness of the measure, as does the area of unoccupied land. Development of an adjusted index to account for these distortions appears warranted.

Other variations in population characteristics such as age structure, genetic groups as well as the rate of population growth were examined. Factors underlying population growth such as birth, death and migration rates are composites of many influences, not necessarily independent of each other.[23] For example, per capita income is negatively associated with the birth rate, -0.27, and average size of family, -0.70, but is positively correlated with the rate of population growth, 0.45. A

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[22]Fisher, Interstate Variations, p. 99.

[23]An indication of interrelationship of the diverse factors associated with population change is presented by J. J. Spengler, "Population Theory", A Survey of Contemporary Economics, Vol. 11, ed. Bernard F. Haley (Homewood, Illinois: Richard D. Irwin, Inc., 1952), pp. 83 - 131.

similar pattern is evident when considering the effect of urbanization.
For the purposes of the study, the diverse influences of population
factors are primarily represented by the following variables; rate of
population growth, density and birth and death rates. Relevant comments
suggest that:

> The behavior of fertility, mortality and migration rates is conditioned
> in considerable degree by the socio-economic circumstances surrounding
> the population in question and by the attitudes, aspirations, etc. of
> its members....Our information is quite limited respecting the function-
> al connections that obtain between the behavior of these elements and
> that of fertility, mortality and migration.[24]

Of the population representatives considered, density and rate
of growth were selected for further analysis. The latter variable, as
indicated by the percentage increase in population from 1950 to 1960,
was considered in an analysis by Fisher who found it significantly
associated with variations in per capita expenditure for six categories,
although the variable did not rank more than third in importance among
the independent variables.[25]

Other variables considered in the inital phase of the study
relate primarily to economic capacity. They were:

1. Per capita personal income; 3 year average, 1955 - 1957

2. Non-tax revenue per capita, 1957

3. Federal revenue per capita, 1957

4. Average weekly earnings of production workers in manufacturing
   industries, 1957

5. Climate as represented by annual average temperature, state
   capitals.

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[24]Ibid., p. 89.

[25]Fisher, Interstate Variations, p. 70.

Previous investigations designate income as the most important factor associated with expenditure variations.[26] With the exception of public welfare expenditures, all functions are positively correlated with income. High correlation exists between income and all expenditure categories with the exception of highways, public welfare, higher education and natural resources.

Income per capita, as shown in Table 2 of Appendix C, is substantially associated with average weekly wages, 0.60; which is itself moderately correlated with non-tax revenue, 0.40; whereas, there exists an almost negligible relationship between the latter variable and income, 0.01. On the basis of the foregoing, and as personal income per capita is a valuable indicator of the wealth of an area, income was included in the multiple regression analysis.

Non-tax revenue per capita includes receipts from the federal government, charges and other miscellaneous non-tax state and local revenue which in 1957 amounted to a total of $9.3 billion, or 20 per cent of total revenue. A marked correlation of non-tax revenue with the larger expenditure categories is evident as shown in Table 6, Appendix C. The coefficient of correlation between non-tax revenue and education is 0.61, highways, 0.52, natural resources, 0.81. general control, 0.57, and total general expenditure, 0.60. As receipts from the federal government are included in non-tax revenue per capita, a high correlation of 0.93 obtained between the two variables.[27] It is not uncommon that federal aid is tied in some manner to specific expenditures by state and local governments. In view of the inclusion of per capita receipts from the federal

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[26]Fabricant, op.cit., pp. 123 - 127.

[27]Appendix C, Tables 2 and 5.

government with non-tax revenue per capita, and "inasmuch as states and localities must spend virtually all the federal aid they receive it is not surprising to find that aid and expenditures move together in a 'statistically significant manner'."[28] Removal of receipts from the federal government from the variable non-tax revenue per capita would seem preferable. Non-tax revenue is associated with density, -0.41, and rate of growth, 0.37, although nominally correlated with income, 0.01. Intercorrelation between independent variables also exists and it is suggested by Morss that a change in model, as opposed to the model used in this and recent studies,[29] would provide a better understanding of forces underlying interstate expenditure variations.[30] However, as the amount of revenue derived from non-tax sources can logically be expected to influence state and local expenditures, albeit adjustments in the components of the variable and model may be required, it was selected for further analysis in phase two of the study.

Federal revenue per capita, has, as mentioned, received recent attention in other similar studies.[31] Federal grants-in-aid are increasing in importance as a source of state and local government revenue, part-icularly with respect to public welfare and highway programs. Often the programs are based on a matching grant system, compounding the effect

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[28]Morss, op. cit., p. 97.

[29]Sacks and Harris, Kurnow and, pertaining to variations in per capita city expenditures, H. E. Brazer, City Expenditures in the United States, Occasional Paper 66, National Bureau of Economic Research, 1959, p. 67.

[30]Morss, op. cit., p. 97.

[31]Kurnow, Sacks and Harris, and Fisher.

on the level of state and local expenditures for particular functions.[32]

The coefficients of simple correlation between total general expenditure per capita and federal revenue is 0.45, and a higher coefficient obtains in the case of non-tax revenue, 0.60.[33] It has been stated that "decisions on federal aid are made by Congress and, hence, insofar as the states are concerned, such assistance may be looked upon as an exogenous variable".[34] Assessment of this information resulted in the selection of non-tax revenue per capita, rather than receipts from the federal government, for further analysis.

Average weekly wages and average temperature were also examined by means of simple correlation. As an indicator of economic capacity, income was selected rather than average weekly wages, in that income is markedly correlated with a greater number of expenditure categories than the wage representative.[35] The coefficient of simple correlation between income and average weekly wages is 0.60, as shown by Table 2, Appendix C.

The relationship between average temperature and expenditure categories was generally negative in both the 48 and 36 state samples. Moderate association is evident between highway expenditures and average temperature, with small or negligible association with the other expenditure categories in evidence.[36]

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[32] The level of government expenditure itself may influence other 'independent' variables of the regression analysis such as the level and distribution of incomes. However, in the case of federal and non-tax revenue, the influence of the level of expenditures would appear of a much higher magnitude.

[33] Appendix C, Table 6.

[34] Kurnow, p. 253. Sacks and Harris also point out that federal aid is "outside money", p. 79.

[35] Appendix C, Table 6.

[36] Appendix C, Tables 6 and 7.

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The simple correlation analysis assisted in the selection of four variables thought to represent the major influences associated with variations in per capita state and local expenditures in 1957. In Chapter IV the results of the analysis are presented.

CHAPTER 1V

COMBINED FACTOR ANALYSIS OF VARIATION IN STATE

AND LOCAL GOVERNMENT EXPENDITURES

The preceeding chapter presented the associations obtaining
between the factors considered and their relationship to individual
expenditure categories, with the analysis assisting in the selection
of four representatives now considered in combination by the technique
of multiple regression.

Combined Factors

The representatives of population and economic characteristics
included in the multiple regression analysis were:

1. Per capita personal income

2. Density of population

3. Rate of population growth

4. Non-tax revenue per capita.

The results of the analysis are presented in terms of the combined
importance of the four selected variables in explaining per capita varia-
tion in state and local government general expenditures with each factor
and expenditure category subsequently examined. Table 5 has been included
for summary purposes and for comparison of mean expenditure, Column 1,
which is repeated from Table 1, with the standard error of estimate,
Column 2. The proportion of variance between actual and estimated values
of the dependent variable which is accounted for by the independent variables
is indicated in Column 3. The coefficients of multiple correlation contained

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TABLE 5

Statistical Relations between Per Capita State and Local Government
Expenditures and Independent Variables, 48 States, 1957

Expenditure Category	Mean[a]	Standard Error of Estimate	Coefficient of Multiple Determination[b]	Coefficient of Multiple Correlation
Total General Expenditure ...	$236.10	$31.34	.66	.81
Total Education Expenditure ...	82.70	10.91	.66	.81
Higher Education	13.65	4.45	.51	.71
Local Schools ...	66.90	8.03	.67	.82
Highways	53.00	14.66	.39	.63
Public Welfare ..	19.88	8.19	.12	.35
Health and Hospitals	16.99	4.16	.50	.71
Police	7.24	1.39	.77	.88
Local Fire	4.07	1.44	.61	.78
Natural Resources	7.92	4.01	.58	.76
Sanitation	7.15	2.72	.44	.66
General Control .	9.94	2.02	.59	.77
Interest on General Debt ..	5.31	1.72	.56	.75
All Other	21.64	6.77	.46	.68

[a]See Table 1.

[b]See Table 6.

Source: Computed from data itemized in Appendix B.

in Column 4, with the exception of expenditure for public welfare, were significant on the basis of an F-test at the 0.05 level, assuming the 48 state sample is drawn from a normal universe.

The four factors accounted for 66 per cent of the interstate variation in total direct general government expenditures per capita in 1957. Fabricant's three variables, as indicated in Table 4, account for 53 per cent of the 1957 interstate variation, while 72 per cent of 1942 general expenditure variation was explained by the three standard variables; income, urbanization, and density. The four factors account for a higher proportion of explained 1957 variation than Fabricant's variables, with the increases in percentage of variation explained evident for higher education, local schools, highways, and health and hospital expenditures. A decrease in the expenditure variation explained is evident for public welfare and local fire protection. Comparison of the 1957 and 1942 results indicate that, for the individual categories, the four factors explain a higher proportion of the interstate expenditure variation in the highway and local school categories than Fabricant's variables. The percentage of variation in per capita general expenditures explained by the four factors of the present study is also very similar to the proportion of variation explained by Fisher,[1] with the use of seven variables. In general, the variables selected in the present study represent the major influences associated with variations in total state and local government general expenditures.

Importance of Individual Factors

The relative importance of each factor in the regression equation

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[1]More will be said on this in a following section. Fisher obtained a coefficient of multiple determination on the basis of seven factors of 0.654 for total general expenditures, 1960. See Fisher, Interstate Variations, p. 64.

in relation to general expenditures can be indicated in several ways.
The net regression coefficients of each regression equation, as well as
associated standard errors, are shown in Table 6. At given levels of
density, per cent population change, and per capita non-tax revenue, an
additional $10 of income per capita was accompanied by approximately
$0.89 of additional direct general expenditure per capita in 1957.
Similarly, a one per cent increase in population, calculated in relation
to population in 1950, was associated with a decrease in general expend-
itures per capita of $0.95. To obtain an improved assessment of the
relative importance of the individual factors, it is preferable to use
"beta" coefficients, shown in Table 7, since the units of measurement
of the explanatory variables differ. Coefficients of partial correlation
are presented in Table 8, and serve to confirm the order of importance
of the explanatory variables as indicated by their beta coefficients.
Elasticity coefficients are shown in Table 9, and indicate the percent-
age change in expenditures associated with a one per cent change in a
specified independent variable, (the other explanatory variables held
constant).

For state and local government general expenditures per capita,
income is the most important in explaining variation among states, since
the beta coefficient at .70, Table 6, is greater than the individual
coefficients for the other three explanatory variables. The factor was
significant at the 95 per cent level in explaining interstate variation,
and positive, in that an increase in personal income per capita was
associated with an increase in the level of per capita state and local
general expenditure. Since income is a partial representative of the
wealth of a state and an indicator of economic activity, the importance
of the variable is not unexpected, in that the quantities of land, labor,

TABLE 6

Regression Equations: Per Capita State and Local Government Expenditures
and Selected Independent Variables, 48 States, 1957

Expenditure Category	Constant Term	Per Capita Income	Density	Rate of Popualtion Growth	Non–Tax Revenue Per Capita	Coefficient of Multiple Determination
Total General Expenditure ...	12.24	.089* (.016)	-.014 (.034)	-.954* (.429)	1.264* (.216)	.66
Total Education Expenditure ...	14.56	.029* (.005)	-.032* (.012)	-.020 (.149	.343* (.075)	.66
Higher Education	3.18	.003 (.002)	-.015* (.005)	.013 (.061)	.106* (.031)	.51
Local Schools ...	9.49	.026* (.004)	-.019* (.009)	-.042 (.112)	.227* (.056)	.67
Highways	-3.09	.021* (.007)	-.016 (.016)	-.352 (,201)	.389* (.101)	.39
Public Welfare ..	10.42	.003 (.004)	-.001 (.009)	-.186 (.112)	.118* (.057)	.12
Health and Hospitals	-1.68	.008* (.002)	.005 (.004)	.007 (.057)	.054 (.029)	.50
Police	- .89	.003* (.001)	.005* (.001)	.058* (.019)	.008 (.010)	.77
Local Fire	-1.67	.003* (.001)	.004* (.002)	.000 (.020)	-.001 (.010)	.61
Natural Resources	-2.03	.000 (.002)	-.005 (.004)	-.004 (.005)	.163* (.028)	.58
Sanitation	1.26	.003* (.001)	.004 (.003)	.097* (.037)	-.013 (.019)	.44
General Control .	-1.13	.004* (.001)	.001 (.002)	.006 (.028)	.065* (.014)	.59
Interest on General Debt ..	.60	.002* (.001)	.006* (.002)	.015 (.024)	-.004 (.012)	.56
All Other	-4.08	.010* (.003)	.017* (.007)	-.017 (.093)	.101* (.047)	.46

*Significant at the .05 level.

The figures in parenthesis are the standard errors of the regression coefficients.

Source: Computed from data itemized in Appendix B.

TABLE 7

Beta Coefficients: Per Capita State and Local Government Expenditure
48 States, 1957

	Per Capita Income	Density	Rate of Population Growth	Non-Tax Revenue Per Capita
Total General Expenditure .	.70	-.05	-.25	.62
Total Education Expenditure	.65	-.33	-.02	.48
Higher Education	.20	-.04	.03	.44
Local Schools	.76	-.25	-.04	.42
Highways	.48	-.02	-.26	.54
Public Welfare	.13	-.03	-.30	.35
Health and Hospitals	.59	.15	.02	.24
Police	.51	.36	.28	.07
Local Fire	.54	.36	.00	-.01
Natural Resources	.00	-.01	-.01	.69
Sanitation	.32	.20	.37	-.09
General Control	.51	.07	.03	.54
Interest on General Debt ..	.37	.46	.08	-.04
All Other	.45	.34	-.02	.28

Source: Computed from data itemized in Appendix B.

TABLE 8

Coefficients of Partial Correlation: Per Capita State and
Local Government Expenditures, 48 States, 1957

	Per Capita Income	Density	Rate of Population Growth	Non-Tax Revenue Per Capita
Total General Expenditure .	.65	.00	-.32	.66
Total Education Expenditure	.64	-.39	.00	.57
Higher Education	.24	-.42	.00	.46
Local Schools	.69	-.31	-.05	.52
Highways	.41	-.16	-.26	.51
Public Welfare	.09	.00	-.24	.30
Health and Hospitals	.51	.15	.00	.27
Police	.60	.49	.42	.13
Local Fire	.52	.39	.00	.00
Natural Resources	.00	-.17	.00	.67
Sanitation	.29	.02	.37	-.10
General Control	.50	.08	.00	.58
Interest on General Debt ..	.37	.46	.10	-.05
All Other	.40	.33	.00	.31

Source: Computed from data itemized in Appendix B.

TABLE 9

Elasticity: Per Capita State and Local Government
Expenditures, 48 States, 1957

	Per Capita Income	Density	Rate of Population Growth	Non-Tax Revenue Per Capita	Total
Total General Expenditure ...	.67	-.01	-.09	.34	.91
Total Education Expenditure ...	.62	-.05	-.01	.26	.82
Higher Education	.40	-.13	.02	.49	.78
Local Schools ...	.69	-.03	-.01	.21	.85
Highways	.72	-.04	-.15	.46	.99
Public Welfare ..	.24	-.01	-.22	.37	.38
Health and Hospitals	.86	.03	.01	.20	1.10
Police	.85	.09	.19	.07	1.20
Local Fire	1.28	.13	.00	-.01	1.41
Natural Resources	.05	-.08	-.01	1.29	1.25
Sanitation	.69	.07	.31	-.11	.96
General Control .	.68	.01	.02	.41	1.12
Interest on General Debt ..	.75	.15	.07	-.05	.91
All Other	.81	.10	-.02	.29	1.18

Source: Computed from data itemized in Appendix B.

capital, technology, organization, and intensity of use are represented.

The density of population was not a significant factor in the explanation of interstate variation in per capita general expenditures, and when the variable was deleted from the analysis, no change in the proportion of unexplained variation was evident.[2] An inverse association between density and general expenditure is indicated by the net regression coefficient, and density is inversely related to the major expenditure categories, although positive in the cases of health and hospitals, police, local fire protection, sanitation and interest on general debt.[3] The inverse relationship is generally attributed to the cost of providing facilities where population is widely dispersed.

The per cent of population change, 1950 - 1957 was a significant factor in the explanation of total general expenditure variation among states. The addition of this variable reduced the proportion of variation to be explained by 10 per cent.[4] In relation to the individual expenditure categories, the variable is significantly associated with police and sanitation expenditures, and ranks first in importance only in the case of sanitation.

A significant association is evident between non-tax revenue per capita and total general expenditures of state and local governments, almost equal in importance to personal income per capita. The addition of the non-tax revenue variable in the regression analysis

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[2]Coefficient of partial determination, .00.

[3]Table 6, Column 3. With respect to city expenditure H. Brazer found a clear positive association to exist between the expenditure categories and density, with the exception of highways. See Brazer, op. cit., p. 29.

[4]The square of the coefficient of partial correlation(-.32) expressed in percentage terms.

decreases the proportion of unexplained variation by 43 per cent.

Similarly, the addition of income to the three other selected variables

explains 43 per cent of the variance left unexplained before the income

variable was added. In terms of beta coefficients, non-tax revenue

ranks second in importance, as shown in Table 7.

By definition, federal aid is included in non-tax revenue. Several

recent studies[5] have stressed the importance of federal aid in explaining

interstate expenditure variations. Morss[6] points out that the use of

federal aid to explain expenditures is "analogous to using taxes to

explain expenditures in the sense that both aid and taxes are sources

of funds". The relation between tax receipts and expenditure is

emphasized by the selection of per capita state and local tax collections

as a variable which Morss explains, by simple correlation, 72 per cent

of interstate differences in 1960 expenditures, indicating a close

relationship between government receipts and expenditures. However,

it is also stated that certain welfare decisions are facilitated by

reference to "equitable norms" and regression analysis may serve to

provide useful information or guidelines. It would then be appropriate

to include "independent variables of welfare interest...regardless of

their explanatory power".[7]

Including the three standard variables as well as federal aid in

their analysis of 1960 expenditures, Sacks and Harris explained 81 per

cent of interstate differences in general expenditures, increasing the

proportion of variation explained on the basis of Fabricant's three

[5]Sacks and Harris, Kurnow, and R. W. Bahl and R. J. Sanders, "Determinants of Changes in State and Local Government Expenditures", National Tax Journal, XVlll. (March, 1965), pp. 50 - 57.

[6]Morss, op. cit., p. 97.

[7]Ibid., p. 100.

variables by 28 per cent.[8]   Considering the results of the present study,
the Sacks and Harris analysis and the comments of Morss, an assessment
of non-tax revenue, excluding revenue from the federal government, as an
independent variable appears warranted. Revenue derived from non-tax
sources, other than from federal aid, is thought to be an important
source of interstate variation in expenditures.

Importance of Factors - Individual Expenditure Categories

The strong association between personal income per capita and the
individual expenditure categories is indicated by Tables 6 and 7. In
eleven of the thirteen categories, the income coefficient is significant,
with a positive relationship indicated in all cases. Income ranks first
in importance in six cases, second in five cases, with little association
evident in two expenditure categories, public welfare and natural resources.
The strong association between expenditures and income is attributed to
the variable as primarily a representative of means. The variable does
not indicate the distribution of income, and income and expenditures
are interrelated in that government expenditures are generally reflected
in personal incomes.

Income is not significantly correlated with public welfare
expenditures. Only 12 per cent of the variation in per capita expend-
itures on public welfare was explained by the four variables and the
proportion of unexplained variation was not noticeably reduced by the
addition of income as the fourth variable in the regression equation.[9]
Simple correlation coefficients suggest that particular representatives,
such as the per cent of the population over age 65, would be more
appropriate, and thus suggest individual consideration of the public

[8]Sacks and Harris, op. cit., p. 81.

[9]See Table 8.

welfare function in terms of "specific" rather than "general" independent
variables.

The four independent variables explained approximately 66 per cent
of the total interstate variation in total education expenditures per
capita. With the addition of income per capita as an explanatory variable,
the proportion of variation unexplained by the other three factors was
reduced by 41 per cent, placing income first in the order of importance
of the explanatory variables. Non-tax revenue was also significantly
correlated with education expenditures, ranking second in importance.
Density was third in rank and inversely associated, indicating a higher
education cost per capita in sparsely populated states. The per cent
population change was not significantly correlated with the expenditure
variable, suggesting that further analysis of the function is required.

A noticeable difference in the relative importance of per capita
income with respect to local school and higher education expenditure was
evident; income per capita of major importance with respect to the former
category, and non-tax revenue of primary importance in the latter case.

Approximately 39 per cent of the variation in interstate highway
expenditure was accounted for by the four variables, with non-tax revenue
of first rank in importance, attributed to the matching requirements of
federal aid programs. Per capita income is the only other significant
variable, and an inverse relationship is evident with respect to density
and per cent population growth. The coefficients of partial determination
presented in Table 8 indicate the influence of the density and per cent
population change variables is not extensive. It would seem appropriate,
in an individual study of highway expenditures, to include as an explan-
atory variable the number of motor vehicles per capita.[10] Other variables

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[10]The simple correlation coefficient between highway expenditure
and the number of motor vehicles per capita, calculated on the basis
of a 36 state sample was 0.65.

of a socio-political nature, although difficult to quantify, might also
be appropriate.

As will be observed from Table 5, the four variables explained
50 per cent of the variation in state and local government expenditures
on health and hospitals. Of the four factors considered, per capita
income was significant and of major importance. The association between
density and health and hospital expenditure was positive, although not
a strong influence and a nominal association was indicated with respect
to per cent population change. Non-tax revenue per capita, when added
to the three other variables, reduced the proportion of variation
unexplained by 7 per cent, while in the case of income per capita, the
reduction was 26 per cent. In short, per capita income is the more
important of the four variables in explaining interstate variation in
per capita expenditures on health and hospitals.

The association between selected expenditure categories and
between selected independent variables as well as the relationships
among the variables are shown in Tables 10, 11 and 12. It will be
noted that, in general, a strong relationship exists between the expend-
iture categories, and between income per capita and urbanization. The
coefficients of simple correlation between the selected expenditure
categories and income, and between the categories and urbanization is
almost identical, suggesting that urbanization is associated with factors
common to income per capita and that the inclusion of both variables in
a multiple regression analysis would not be appropriate. Urbanization
was therefore excluded from the analysis.

The four variables accounted for the major proportion of the
variation among states for the remaining categories; police, local

TABLE 10

Coefficients of Simple Correlation between Selected

Per Capita Expenditure Categories, 48 States, 1957

Expenditure Category	Health and Hospitals	Police	Local Fire	Sanitation	General Control
Police	0.76				
Local Fire	0.75	0.82			
Sanitation	0.52	0.75	0.55		
General Control	0.64	0.66	0.55	0.48	
Local Schools .	0.51	0.51	0.31	0.31	0.68

Source: Refer Appendix C.

TABLE 11

Coefficients of Simple Correlation between Selected

Independent Variables, 48 States, 1957

Independent Variable	Income Per Capita	Density	Rate of Population Growth	Non-Tax Revenue Per Capita
Density	0.50			
Rate of Population Growth	0.45	-0.05		
Non-Tax Revenue .. (Per Capita)	0.01	-0.41	0.37	
Urbanization	0.83	0.67	0.34	-0.17

Source: Refer Appendix C.

TABLE 12

Coefficients of Simple Correlation between Selected Per Capita

Expenditure Categories and Selected Independent Variables,

48 States, 1957

	Income Per Capita	Urbanization	Density	Rate of Population Growth	Non-Tax Revenue Per Capita
Health and Hospitals ...	0.67	0.62	0.34	0.36	0.19
Police	0.81	0.84	0.57	0.52	0.04
Local Fire	0.73	0.79	0.63	0.25	-0.14
Sanitation	0.62	0.66	0.38	0.57	0.00
General Control	0.61	0.43	0.09	0.60	0.56

Source: Refer to Appendix C.

fire protection, natural resources, sanitation, general control,

interest on general debt, and other per capita expenditures. Per capita

income was a significant factor in every case with the exception of

natural resources; density was a significant factor in the cases of

police, local fire protection, interest on general debt and other

expenditures; in two cases per cent population proved significant; and

in three categories, non-tax revenue per capita was of significant

importance in explaining variation in the above categories.

Per capita income and density were of similar importance in

explaining interstate variations in police and local fire protection

expenditures per capita. The addition of income per capita to the

three other variables decreased the unexplained variation by 36 and 27 per cent respectively, with the four factors explaining 77 per cent of the total interstate variation in police expenditures, and 61 per cent of the variation in per capita expenditure among states for local fire protection. In the case of police expenditures, the per cent population change when added to the three other variables reduced the unexplained variation by 18 per cent; similarly, addition of density resulted in a 23 per cent reduction in unexplained variation. In both categories the relation to density was positive and significant.

Non-tax revenue accounted for the major proportion of variation in per capita expenditures by state and local governments on natural resources, with the four variables explaining 58 per cent of the total variation. The addition of non-tax revenue to the three other factors decreased unexplained variation by 44 per cent, and it will be noted from Table 6 that the relationship between the category and density is inverse. Income per capita does not appear associated with variations in expenditure in the natural resources category.

The variable, per cent population change, was of first rank in importance in explaining variations among states in expenditures on sanitation. The four variables explained 44 per cent of the interstate variation, with the addition of the above variable to the other three factors decreasing unexplained variation by 13 per cent. Per capita income, also a significant factor, ranked second in importance and the remaining factors were not strongly associated with sanitation expenditures.

Approximately 59 per cent of the variation in state and local

expenditures per capita on general control was explained by the four factors, with non-tax revenue per capita ranking first; income, second; and density, third in order of importance.

Per capita income and density were significant factors in explaining the variance among states in interest on general debt and other per capita expenditures. The four variables explained 56 and 46 per cent of the total variations, respectively, and in the case of the "other expenditures" category, non-tax revenue was also a significant factor, of similar importance to density.

Per capita income is, in almost every case, the major determinant of variance among states in per capita expenditures on government activities. A clear positive association is evident between density and police expenditure, as well as for local fire protection and in the larger expenditure categories an inverse relationship exists, acting to reduce expenditures as population density increases, other factors remaining constant. Per cent population change is significant in two instances, police and sanitation, with an inverse relationship existing between the variable and the major expenditure categories. A strong association is evident between non-tax revenue per capita and interstate variation in per capita expenditures in eight cases, including the major functions.

As outlined previously, the importance of federal aid has been stressed by the Sacks and Harris as well as the Kurnow studies. The influence of federal aid is represented by the variable, non-tax revenue per capita, in the present study. For normative purposes the inclusion of non-tax revenue is appropriate. However, an investigation of the separate relationship of non-tax revenue, excluding federal aid, and the individual expenditure categories should prove useful.

Several other types of influences are considered by Fisher[11] including median income of families, per capita yield of representative property tax, 1960, as a per cent of U.S. average; per cent of population living in urban places outside Standard Metropolitan Statistical Areas, 1960; and per cent of population in Standard Metropolitan Statistical Areas, 1960.

In view of the relative importance of expenditure on education in relation to total general expenditure and as an indicator of the quality of services offered, Kurnow[12] selected the student-teacher ratio in elementary schools in each state as a variable warranting analysis.

The factors associated with changes in the level of state and local governmental expenditures has received attention in the study by Bahl and Saunders[13], in which changes in per capita federal grants receives emphasis. Changes in public school enrolment is also selected for attention.

Urbanization is included in the expenditure studies by Fabricant, Fisher, Kurnow, Sacks and Harris, and change in urban population is considered by Bahl and Saunders. With the exception of the Kurnow analysis, density of population is considered in conjunction with urbanization. In the present study, because of the relatively strong association with income and density, urbanization was excluded from the multiple regression analysis.

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[11]Fisher, Interstate Variations, pp. 60 - 63.

[12]Kurnow, op. cit., p. 253.

[13]R. W. Bahl, and R. J. Saunders, "Determinants of Changes in State and Local Government Expenditures", National Tax Journal, XVlll (March, 1965), pp. 50 - 57.

The foregoing discussion has presented the results of the regression analysis with reference to other studies of variation in per capita state and local expenditures. A summary and conclusions are presented in the following chapter.

CHAPTER V

SUMMARY AND CONCLUSIONS

Extensive variation is evident among states in the activities of
state and local governments, as measured by per capita expenditures,
both with respect to the individual functional categories and total direct
general expenditure. This suggests the variation is due to many
influences, some of which are difficult to quantify. Some factors
responsible for interstate variation in expenditures may be common to
the majority of, if not all, states. The study has attempted to identify
and assess the major, common influences associated with interstate
variation in expenditures per capita, by use of statistical techniques,
primarily linear multiple regression analysis, in a cross sectional
study of per capita state and local government expenditures.

The four selected factors account for approximately 66 per cent
of the differences among states in total general expenditures per capita.
Of primary importance is per capita income, appearing to confirm previous
studies of a similar nature. Non-tax revenue per capita is almost
equivalent in importance to per capita personal income and per cent
population change contributed to the explanation of expenditure
differences. Density of population appears to have little effect on
variations in total general expenditure per capita.

The results tend to be distorted to the extent that explanatory
variables are components of the dependent variable. That is, federal
revenue received by the state and local governments can be considered a

component of expenditure as states are generally required to spend all the federal funds received, and must necessarily be statistically related, provided that receipt and expenditure occur in the same fiscal period. While not particularly informative in the sense of understanding the influences underlying expenditure variations, per capita non-tax revenue is a suitable variable for normative purposes.[1] Non-tax revenue per capita, excluding federal revenue, is similar in this respect, but inclusion as a separate independent variable would appear useful.

For twelve of the thirteen expenditure categories, the level of expenditure is significantly correlated with the four selected categories, the exception being expenditures for public welfare. Personal income per capita is of predominant importance, non-tax revenue per capita ranks second, with density of population and per cent population change generally of minor importance. Different measures of the relative importance of the individual variables indicate small changes in rank, but are consistent in terms of approximate measurement.

In most instances the correlation between the functions and both income and non-tax revenue is positive. The demographic variables are, in general, inversely correlated with the expenditure categories, other than for expenditures on health and hospitals, police, fire, sanitation, general control and interest on general debt. Other than for sanitation, the influence of the demographic factors is relatively small, as indicated by elasticity coefficients.

The combined effect of a one per cent change in each factor is noticeably greater in the cases of health and hospitals, police, fire,

[1]For an exposition of adjustments required in establishing standards of expenditure on specific functions, see Hanson, op. cit.

natural resources, and general control than for the major categories,
particularly in the case of public welfare. In terms of total general
expenditures, the aggregate effect of a one per cent increase in each
factor is slightly less than a one per cent increase in per capita
expenditure.

In general, the study indicates that the major determinant of
variation in state and local expenditure is per capita personal income,
which confirms previous analyses. While not represented in the present
study, the inclusion of a variable indicating the distribution of income
appears warranted, although examination of this aspect by Fisher[2] did
not produce significantly different results, as the income was replaced
by another factor highly correlated with income. Construction of an
appropriate index seems required.

Population dispersion, as reflected by density, is not an entirely
adequate representative, as indicated by the results of the study. While
the rural-urban movement of population has, at some point, a limit, the
wide differences in the degree of urbanization among states in 1957 must
necessarily affect expenditures, particularly of the local government
units. Differences in land area must also be reflected in such expend-
itures as education and highways. Assessment of the influence of these
characteristics would be facilitated by the development of increasingly
precise variables, utilizing a model designed to handle intercorrelation
between variables.

While the four factors account for the major variation in expend-
itures, other approaches may prove rewarding. It has been suggested that
more attention be given to the individual functions, by the selection of

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[2]Fisher, Interstate Variations, p. 61.

"specific" rather than "general" variables. Attention can be directed toward the individual government unit, rather than the aggregate of state and local activities. Time series analysis may be selected rather than the cross sectional approach of the present study. The purpose dictates the approach.

The study indicates the relative importance and direction of influence of the four factors in each of the individual expenditure categories as well as total general expenditures. The range of variation explained by the factors with respect to the individual categories is 12 to 77 per cent and, for total general expenditures, 66 per cent. Further investigation is warranted; various approaches can be selected, different variables devised, different models constructed, with due consideration to the statistical techniques employed.

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APPENDIX A

DATA

The Bureau of the Census reports state and local government
expenditures by function as well as by character and object. Expend-
itures, as classified by function, include capital outlays as well as
current operation costs, but does not include "payments for the
retirement of indebtedness"[1]. Only final, or direct, expenditure of
state and local governments is considered in that data is net of inter-
governmental transactions.

A number of categories of expenditure are studied, the first
being total general expenditure of state and local governments, defined
as total expenditure less utility, liquor stores and insurance trust
expenditures. Other functions studied are: education, highways, public
welfare, health and hospitals, police, local fire protection, natural
resources, sanitation, general control, interest on general debt, and
the residual category "other".

Education expenditure is considered in terms of total expenditures
and in relation to two subclasses, local schools and state institutions
of higher education. Total education expenditures are slightly greater
than the sum of the subclasses in that costs include "supervision of
local school systems by state education departments and in some instances

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[1]U.S. Department of Commerce, Bureau of the Census, 1957 Census
of Governments, Advance Release No. 8, "State and Local Government Finances
in 1957," (U. S. Government Printing Office, Washington, D.C. 1959) p. 5.

by county offices; state schools for the handicapped; and miscellaneous special educational programs and activities."[2]

The category "state institutions of higher education" does not include "spending for hospitals operated by state universities, or agricultural experimental stations and extension services," but does include expenditures relating to dining halls, dormitories and book stores.

Local school expenditure "mainly pertains to the elementary and high school grades but includes also, without distinction, relatively minor amounts of local government expenditure for college education in some states. The 'local schools' category includes all direct general expenditure of local school systems other than interest, and any payments made directly by other governments for local school purposes."[3] School cafeteria, recreation, health and library services are also included in this category.

Highway expenditures relate to the "provision and maintenance of regular roads, highways . . . city streets . . . toll turnpikes, bridges, tunnels, and ferries."[4]

Expenditures on "Public Welfare" covers "institutional and non-institutional aid to the needy, and the administration of such aid. A major portion of all expenditure shown under this heading pertains to the 'categorical' public assistance programs - old age assistance, aid to dependent children, aid to the blind, and aid to the disabled - which are financed in part from Federal grants."[5]

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[2] Ibid.,p. 6.

[3] Ibid.

[4] Ibid.

[5] Ibid.

Natural resources encompass "government services for the promotion of agriculture, and for conservation, forests, wildlife, irrigation, and . . . expenditure for state parks."[6]

The functional heading "general control" is "used to cover expenditure for tax enforcement and other financial and general administration, as well as legislative bodies, courts, and the chief executives and central staff agencies of state and local governments."[7]

All interest payments on state and local government indebtedness, exclusive of utility indebtedness, are included in the category "Interest on general debt".

The term "All other general expenditure" denotes a residual category including expenditures on " . . . local parks and recreation, nonhighway transportation, correction, housing and community development, general public buildings, employment security administration, and local libraries."[8]

It is reported by the Bureau of the Census that some of the amounts stated "represent estimates based on information obtained from a stratified random sample of governmental units. . . . However, statewide estimates presented for large or common items are probably subject to relatively little sampling variation, and nationwide totals reported here are likely to resemble closely the results obtainable from a complete enumeration."[9]

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[6] Ibid., p. 7.

[7] Ibid.

[8] Ibid.

[9] Ibid., p. 11.

APPENDIX B

DESCRIPTION OF VARIABLES

Expenditure Categories

The state and local government expenditure categories are recorded
in terms of 1957 dollars per capita, obtained from the U.S. Department
of Commerce, Bureau of the Census, 1957 Census of Governments, Advance
Release No. 8, "State and Local Government Finances in 1957" (Washington,
D.C., 1959), pp. 28 - 76.

Independent Variables

The source of information for all independent variables is the
U.S. Department of Commerce, Bureau of the Census, Statistical Abstract
of the United States: 1959, Washington, D.C., 1959.

1. Personal Income per capita: a simple average of personal income in
   the years 1955 to 1957.

   Source: Ibid., p. 311.

2. Urbanization: per cent population living in communities of over
   2,500.

   Source: Ibid., p. 16.

3. Density of population, 1957: Population density per square mile,
   state land area.

   Source: Ibid., p. 10, 160.

4. Rate of population growth: per cent change in population from 1950
   to 1957 in terms of 1950 population.

   Source: Ibid., p. 10, 12.

5. Population-Age Structure: per cent of estimated civilian population, 1957.

   Under 5 years.

6. 5 to 17 years.

7. 18 to 64 years.

8. 65 and over.

   Source: Ibid., p. 25.

9. White population: per cent white population in 1950.

   Source: Ibid., p. 30.

10. Crude birth rate: rate per 1,000 population, estimated as at July 1, 1958.

    Source: Ibid., p. 54.

11. Death rate: rate per 1,000 population, estimated as at July 1, 1958.

    Source: Ibid., p. 64.

12. Infant mortality: under 1 year of age, rate per 1,000 live births, 1957.

    Source: Ibid., p. 68.

13. Average size of family, 1950.

    Source: Ibid., p. 44.

14. Density, 1950: population per square mile.

    Source: Ibid., p. 13.

15. Federal revenue per capita, 1957.

    Source: Ibid., p. 409.

16. Non-Tax revenue per capita, 1957: includes federal government revenue as well as charges and miscellaneous revenues.

    Source: Ibid., p. 409.

17. Annual Average Temperature, State Capitals: in Fahrenheit degrees.

    Source: Ibid., p. 167.

18. Number of motor vehicles per capita, 1957.

   Source: Ibid., p. 559.

19. Average weekly wage, 1957: production workers in manufacturing industries.

   Source: Ibid., p. 231.

20. Males per 100 females: per cent in 1950.

   Source: Ibid., p. 23.

21. Median Age of population, 1950.

   Source: Ibid., p. 27.

APPENDIX C

CORRELATION BETWEEN THE INDEPENDENT VARIABLES, BETWEEN THE

EXPENDITURE CATEGORIES, AND BETWEEN THE INDEPENDENT

VARIABLES AND EXPENDITURE CATEGORIES

The sources of the information used to calculate the coefficients
of simple correlation presented in Tables 1 - 8 are U.S. Department of
Commerce, Bureau of the Census, Statistical Abstract of the United
States: 1959, Washington, D.C., and U.S. Department of Commerce,
Bureau of the Census, 1957 Census of Governments, Advance Release
No. 8, "State and Local Government Finances in 1957," Washington,
D.C., 1959. See Appendix A and Appendix B for source and definition
of specific variables.

APPENDIX C

TABLE 1

Coefficients of Simple Correlation between Selected Independent Variables

48 States

	Urbanization	Density	Rate of Growth	Population					Birth Rate	Death Rate	Infant Mortality	Average Size of Family
				0-5	5-17	18-64	65 and over	White				
Density	0.67											
Rate of Growth	0.34	-0.05										
Population –												
0-5 years ..	-0.17	-0.37	0.46									
5-17 years .	-0.73	-0.54	-0.15	0.42								
18-64 years	0.76	0.66	0.20	-0.46	-0.88							
65 and over	0.07	0.11	-0.47	-0.52	-0.55	0.20						
White	0.33	0.10	0.03	-0.02	-0.54	0.32	0.44					
Birth Rate ...	-0.21	-0.35	0.26	0.66	0.62	-0.64	-0.55	-0.25				
Death Rate ...	0.28	0.36	-0.24	-0.54	0.65	0.48	0.70	0.17	-0.46			
Infant Mortality	-0.34	-0.30	0.25	0.45	0.64	-0.48	-0.61	-0.45	0.61	-0.41		
Average Size of Family ..	-0.60	-0.13	-0.33	0.16	0.78	-0.60	-0.43	-0.60	0.46	-0.32	0.51	
Males per 100 Females	-0.33	-0.45	0.25	0.49	0.23	-0.29	-0.25	0.35	0.17	-0.48	0.12	-0.12
Income	0.83	0.50	0.45	-0.09	-0.78	0.80	0.61	0.49	-0.27	0.24	-0.40	-0.69
Federal Revenue	-0.29	-0.44	0.19	0.46	0.37	-0.43	-0.29	0.09	0.40	-0.39	0.40	-0.02
Non-Tax Revenue	-0.17	-0.41	0.37	0.56	0.30	-0.34	-0.40	0.10	0.47	-0.46	0.40	-0.08
Average Weekly Wage	0.43	-0.03	0.41	0.33	-0.30	0.25	-0.11	0.61	0.09	-0.23	-0.13	-0.58
Average Temperature	-0.09	-0.09	0.19	0.08	0.36	-0.19	-0.35	-0.73	0.21	-0.20	0.52	0.25

APPENDIX C

TABLE 2

Coefficients of Simple Correlation between Selected Independent Variables

48 States

	Income	Density	Rate of Growth	Non-Tax Revenue	Federal Revenue	Average Weekly Wage
Density	0.50					
Rate of Growth	0.45	-0.05				
Non-Tax Revenue ...	0.01	-0.41	0.37			
Federal Revenue ...	-0.15	-0.44	0.19	0.93		
Average Weekly Wage	0.60	-0.03	0.41	0.40	0.25	
Average Temperature	-0.34	-0.09	0.19	-0.07	-0.08	-0.32

36 States

	Income	Density	Rate of Growth	Non-Tax Revenue	Federal Revenue	Average Weekly Wage
Density	0.50					
Rate of Growth	0.55	-0.05				
Non-Tax Revenue ...	0.03	-0.43	0.46			
Federal Revenue ...	-0.13	-0.44	0.28	0.93		
Average Weekly Wage	0.44	-0.16	0.53	0.43	0.28	
Average Temperature	0.08	0.14	0.13	-0.30	-0.27	-0.01
Motor Vehicles a)	-0.01	-0.43	0.39	0.80	0.75	0.49

a) Calculated only for the 36 State sample.

APPENDIX C

TABLE 3

Coefficients of Simple Correlation between Selected Independent Variables

36 States

	Urban-ization	Density	Rate of Growth	Population					Birth Rate	Death Rate	Infant Mort-ality	Average Size of Family
				0-5	5-17	18-64	65 and over	White				
Density	0.71											
Rate of Growth	0.29	-0.05										
Population -												
0-5 years ..	-0.30	-0.52	0.58									
5-17 years .	-0.74	-0.60	-0.12	0.56								
18-64 years	0.79	0.70	0.28	-0.52	-0.84							
65 and over	-0.07	0.05	-0.68	-0.61	-0.36	-0.08						
White	-0.07	-0.11	-0.13	0.02	-0.05	-0.28	0.45					
Birth Rate ...	-0.20	-0.38	0.27	0.75	0.51	-0.53	-0.38	0.12				
Death Rate ...	0.26	0.34	-0.31	-0.69	-0.66	0.43	0.65	0.12	-0.38			
Infant Mortal-ity	-0.36	-0.25	0.22	0.19	0.41	-0.11	-0.47	-0.38	0.12	-0.16		
Average Size of Family ..	-0.51	-0.04	-0.41	0.06	0.61	-0.42	-0.15	-0.20	0.32	-0.16	0.30	
Males per 100 Females	-0.51	-0.53	0.31	0.67	0.55	0.50	0.41	0.22	0.31	-0.60	0.30	0.01
Income	0.80	0.50	0.55	-0.11	-0.72	0.78	-0.21	-0.10	-0.13	0.17	-0.26	-0.58
Federal Revenue	-0.33	-0.44	0.28	0.54	0.38	-0.39	-0.27	0.30	0.29	-0.37	0.32	-0.16
Non-Tax Revenue	-0.27	-0.43	0.46	0.63	0.31	-0.29	-0.42	0.22	0.33	-0.47	0.28	-0.22
Average Week-ly Wage	0.23	-0.16	0.53	0.42	-0.01	0.08	-0.41	0.16	0.21	-0.46	-0.10	-0.50
Average Temp-erature	0.19	0.14	0.13	-0.17	-0.06	0.30	-0.23	-0.64	-0.29	-0.06	0.27	-0.13

APPENDIX C

TABLE 4

Coefficients of Simple Correlation between Per Capita Expenditure Categories
36 States, 1957.

Expenditure Category	Total Education	Higher Education	Local Schools	Highways	Public Welfare	Health and Hospitals	Police	Local Fire	Natural Resources	Sanitation	General Control	Interest on General Debt
Higher Education	0.75											
Local Schools	0.94	0.50										
Highways	0.41	0.32	0.36									
Public Welfare	0.25	0.17	0.26	0.03								
Health and Hospitals ...	0.36	-0.05	0.52	0.25	0.20							
Police	0.22	-0.27	0.45	0.00	0.08	0.75						
Local Fire Protection ..	0.02	-0.36	0.22	0.06	0.23	0.74	0.81					
Natural Resources	0.52	0.50	0.43	0.54	0.07	0.26	0.07	-0.02				
Sanitation	0.02	-0.26	0.18	-0.11	-0.20	0.47	0.71	0.50	-0.05			
General Control	0.57	0.27	0.63	0.49	0.24	0.62	0.60	0.49	0.70	0.36		
Interest on General Debt	-0.07	-0.54	0.16	-0.16	-0.05	0.50	0.70	0.57	-0.35	0.50	0.18	
All Other	0.24	-0.17	0.42	0.20	0.16	0.74	0.80	0.74	0.18	0.48	0.67	0.56

APPENDIX C

TABLE 5

Coefficients of Simple Correlation between Selected Independent Variables and Expenditure Categories

48 States

Expenditure Category	Urbanization	Population					Birth Rate	Death Rate	Infant Mortality	Average Size of Family	Males per 100 Females
		0-5	5-17	18-64	65 and over	White					
Total Direct											
General Expenditure	0.45	0.27	-0.40	0.28	-0.02	0.51	0.10	-0.01	-0.18	-0.58	0.45
Total Education	0.29	0.46	-0.12	0.02	-0.18	0.46	0.27	-0.38	-0.06	-0.46	0.52
Higher Education ..	-0.18	0.57	0.23	-0.40	-0.15	0.35	0.36	-0.50	0.10	-0.20	0.65
Local Schools	0.47	0.33	-0.27	0.19	-0.16	0.46	0.17	-0.28	-0.13	-0.53	0.39
Highways	-0.02	0.26	-0.20	-0.02	0.17	0.48	0.05	0.06	-0.18	-0.31	0.56
Public Welfare	0.13	-0.09	-0.04	-0.08	0.22	0.04	0.10	0.12	0.00	-0.23	-0.10
Health and Hospitals	0.63	-0.12	-0.54	0.57	-0.02	0.29	-0.14	0.24	-0.27	-0.49	0.04
Police	0.84	-0.10	-0.66	0.76	-0.10	0.25	-0.20	0.22	-0.24	-0.56	-0.08
Fire Protection	0.80	-0.25	-0.73	0.73	0.20	0.42	-0.31	0.45	-0.41	-0.55	-0.20
Natural Resources ..	-0.18	0.50	0.21	-0.28	-0.28	0.20	0.32	-0.32	0.28	-0.17	0.76
Sanitation	0.66	0.06	-0.51	0.60	-0.19	0.21	-0.08	0.10	-0.10	-0.43	-0.03
General Control	0.43	0.23	-0.44	0.35	-0.05	0.51	0.04	0.05	-0.13	-0.59	0.48
Interest on											
General Debt	0.71	-0.27	-0.53	0.70	-0.05	-0.04	-0.24	0.32	-0.17	-0.27	-0.43
All Other	0.64	0.00	-0.56	0.60	-0.05	0.28	-0.09	0.21	-0.28	-0.42	0.06

APPENDIX C

TABLE 6

Coefficients of Simple Correlation, Selected Independent Variables and Expenditure Categories

48 States

Function	Income	Density	Rate of Growth	Non-Tax Revenue	Federal Revenue	Average Weekly Wage	Temperature
Total Direct General Expenditure	0.64	0.06	0.50	0.60	0.45	0.66	-0.38
Total Education	0.48	-0.20	0.48	0.61	0.47	0.77	-0.29
Higher Education	0.00	-0.52	0.31	0.63	0.56	0.55	-0.26
Local Schools	0.62	-0.03	0.47	0.51	0.36	0.77	-0.27
Highways	0.29	-0.12	-0.17	0.52	0.48	0.35	-0.49
Public Welfare	-0.02	-0.10	-0.11	0.26	0.27	0.12	0.10
Health and Hospitals	0.68	0.35	0.37	0.20	0.07	0.31	-0.34
Police	0.82	0.57	0.53	0.04	-0.11	0.44	-0.10
Local Fire Protection	0.73	0.64	0.25	-0.14	-0.21	0.27	-0.27
Natural Resources	0.02	-0.43	0.48	0.81	0.79	0.36	-0.11
Sanitation	0.63	0.38	0.58	-0.01	-0.19	0.45	-0.02
General Control	0.62	0.10	0.61	0.57	0.45	0.58	-0.34
Interest on General Debt	0.63	0.66	0.19	-0.20	-0.36	0.14	0.11
All Other	0.67	0.45	0.41	0.17	-0.01	0.38	-0.25

TABLE 7

Coefficients of Simple Correlation, Selected Independent Variables and Expenditure Categories
36 States

Function	Income	Density	Rate of Growth	Non-Tax Revenue	Federal Revenue	Average Weekly Wage	Temperature
Total Direct General Expenditure	0.56	0.00	0.53	0.65	0.52	0.50	- 0.36
Total Education	0.38	- 0.29	0.48	0.64	0.51	0.71	- 0.26
Higher Education	- 0.16	- 0.59	0.33	0.60	0.54	0.49	- 0.33
Local Schools	0.56	- 0.09	0.45	0.54	0.40	0.70	- 0.17
Highways	0.10	- 0.21	0.17	0.55	0.52	0.11	- 0.49
Public Welfare	0.06	- 0.09	- 0.04	0.15	0.22	0.12	- 0.09
Health and Hospitals	0.66	0.31	0.41	0.25	0.12	0.26	- 0.18
Police	0.82	0.58	0.50	0.04	- 0.08	0.36	0.11
Local Fire Protection	0.66	0.63	0.29	- 0.15	- 0.19	0.03	0.02
Natural Resources	- 0.03	- 0.47	0.45	0.88	0.88	0.35	- 0.29
Sanitation	0.58	0.38	0.54	- 0.08	- 0.22	0.39	0.20
General Control	0.51	0.04	0.64	0.66	0.56	0.45	- 0.26
Interest on General Debt	0.72	0.70	0.20	- 0.30	- 0.42	0.06	0.25
All Other	0.63	0.55	0.38	0.18	0.01	0.22	- 0.15

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APPENDIX C

TABLE 8

Coefficients of Simple Correlation between Selected Independent Variables and Expenditure Categories

36 States

Expenditure Category	Urbanization	Population					Birth Rate	Death Rate	Infant Mortality	Average Size of Family	Males per 100 Females
		0-5	5-17	18-64	65 and over	White					
Total Direct											
General Expenditure	0.31	0.31	-0.28	0.19	-0.17	0.36	0.14	-0.10	-0.25	-0.55	0.41
Total Education	0.14	0.53	0.05	-0.12	-0.26	0.27	0.31	-0.48	-0.28	-0.49	0.48
Higher Education	-0.34	0.70	0.45	-0.56	-0.23	0.32	0.44	-0.60	-0.01	-0.17	0.64
Local Schools	0.36	0.34	-0.17	0.12	-0.23	0.20	0.18	-0.34	-0.37	-0.59	0.31
Highways	-0.24	0.33	0.02	-0.24	0.08	0.39	0.15	-0.02	-0.16	-0.14	0.52
Public Welfare	0.19	-0.11	-0.15	-0.06	0.33	0.40	0.10	-0.14	-0.05	-0.37	-0.08
Health and Hospitals	0.61	-0.07	-0.53	0.56	-0.15	0.12	-0.09	0.19	-0.19	-0.50	-0.02
Police	0.82	-0.18	-0.67	0.81	-0.27	-0.07	-0.22	0.17	-0.20	-0.53	-0.18
Fire Protection	0.77	-0.33	-0.71	0.70	0.05	0.16	-0.25	0.43	-0.30	-0.45	-0.36
Natural Resources	-0.30	0.55	0.31	-0.30	-0.33	0.36	0.25	-0.37	0.23	-0.24	0.83
Sanitation	0.60	0.05	-0.43	0.60	-0.42	-0.21	-0.04	0.04	-0.01	-0.30	-0.12
General Control	0.29	0.31	-0.31	0.27	-0.26	0.37	-0.10	-0.06	-0.06	-0.53	0.44
Interest on											
General Debt	0.73	-0.44	-0.64	0.82	-0.13	-0.36	-0.36	0.33	-0.12	-0.21	-0.50
All Other	0.58	-0.09	-0.55	0.61	-0.18	0.06	-0.11	0.15	-0.31	-0.36	-0.01